Small Business Innovation Research/Small Business Tech Transfer

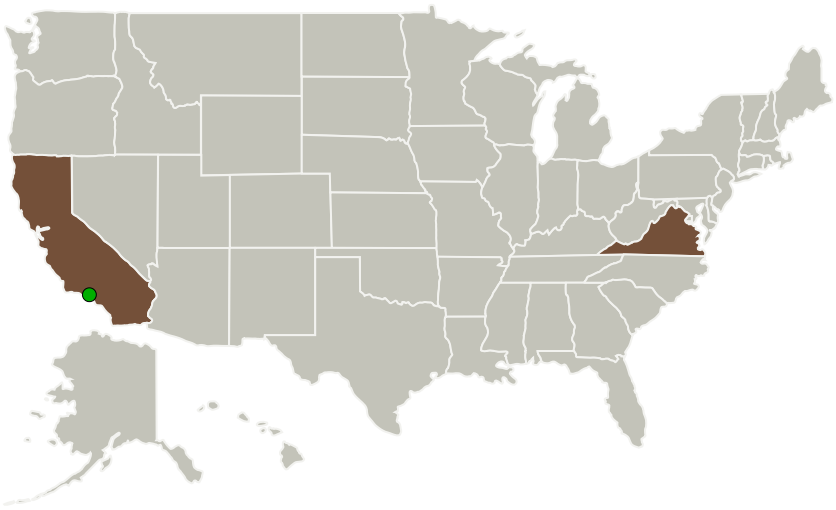
High Power (50W) WDM Space Lasercom 1.5um Fiber Laser Transmitter, Phase I

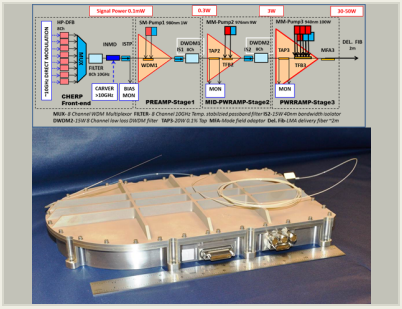
Completed Technology Project (2017 - 2017)

Project Introduction

Fibertek proposes to develop and demonstrate a spaceflight prototype of a wideband, high power (up to 50W), polarization maintaining (PM), 1.5-um fiber laser transmitter, supporting high data rate wavelength-division-multiplexed (WDM) operation for space optical communication links. The proposed 1.5-um fiber laser transmitter will support up to 8x WDM channels at 4W/channel, with 256-ary pulse-position-modulation (PPM) format, operating at ~10-kW peak power per channel, with >20-nm gain-flat bandwidth, and with 20% power conversion efficiency. The proposed 1.5-um fiber laser transmitter also supports 20x WDM channels at 2.5W/channel, operating at 10 GHz data rate (for 200GHz total) in burst-mode RZ-DPSK modulation. The proposed 10x scaling of the average and peak power performance for such a space-qualifiable WDM 1.5-um transmitter enables >100x data-rate scaling of current space laser communication links. The successful outcome of Phase I and II will be to develop a prototype, space-qualifiable, high-efficiency, high-power (50W), 1.5-um WDM space lasercom transmitter. This advances the Technology Readiness Level (TRL) from 3 to 5 and supports TRL-6 environmental testing in subsequent phases.

Primary U.S. Work Locations and Key Partners





High Power (50W) WDM Space Lasercom 1.5um Fiber Laser Transmitter, Phase I Briefing Chart Image

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Organizations Performing Work	Role	Type	Location
Fibertek, Inc.	Lead Organization	Industry	Herndon, Virginia
Jet Propulsion Laboratory(JPL)	Supporting Organization	NASA Center	Pasadena, California

Primary U.S. Work Locations	
California	Virginia

Project Transitions

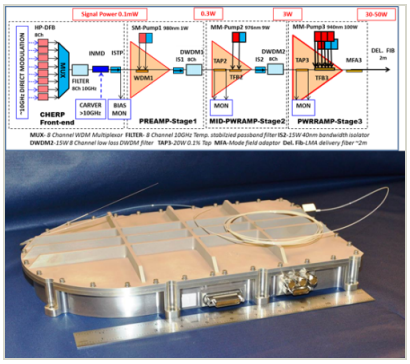
June 2017: Project Start

December 2017: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/140758)*

Images



Briefing Chart Image
High Power (50W) WDM Space Lasercom 1.5um Fiber Laser Transmitter, Phase I Briefing Chart Image
(https://techport.nasa.gov/image/125877)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Fibertek, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

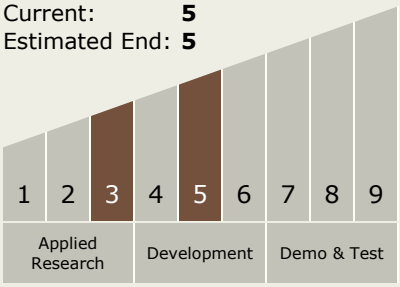
Carlos Torrez

Principal Investigator:

Doruk Engin

Technology Maturity (TRL)

Start: **3**
Current: **5**
Estimated End: **5**



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Technology Areas

Primary:

- TX05 Communications, Navigation, and Orbital Debris Tracking and Characterization Systems
  - TX05.1 Optical Communications
    - TX05.1.3 Lasers